THE CRUSHED STONE JOURNAL

Official Publication
The National Crushed Stone Association

In This Issue—

NOVEMBER, 1929

WHY HAVE LOSSES

Poor Grading—High Overhead—Troubles

Ask the following stone producers why they are using NIAGARA ROLLER BEARING SCREENS year after year

Solvay Process Company	Jamesville, N. Y.
Solvay Process Company	Syracuse, N. Y.
Rock-Cut Stone Company	Auburn, N. Y.
Rock-Cut Stone Company	Ballina, Madison Co., N. Y.
Rock-Cut Stone Company	Jamesville, N. Y.
Rock-Cut Stone Company	Lacona, N. Y.
Rock-Cut Stone Company	Watertown, N. Y.
Mohawk Limestone Products Company	Mohawk, N. Y.
Mohawk Limestone Products Company	Jordanville, N. Y.
Mohawk Limestone Products Company	Mount Vision, N. Y.
BUFFALO Crushed Stone Company	Buffalo, N. Y.
Federal Crushed Stone Company	Cheektowaga, N. Y.
Genesee Stone Products Company	Stafford, N. Y.
LeRoy Lime and Crushed Stone Company	LeRoy, N. Y.
Ribstone Concrete Products	LeRoy, N. Y.
Dolomite Products Company	Rochester, N. Y.
General Crushed Stone Company	Oaks Corners, N. Y.
General Crushed Stone Company	North LeRoy, N. Y.
General Crushed Stone Company	Glenmills, Penna.
Wagner Quarries	Sandusky, Ohio
Wagner Quarries	Castalia, Ohio
Dolomite, Inc.	Maple Grove, Ohio
Herzog and Sons	Forest, Ohio
Ohio Blue Limestone	Marion, Ohio
National Lime & Stone Co.	Spore, Ohio
National Lime & Stone Co.	Carey, Ohio
National Lime & Stone Co.	Lewisburg, Ohio
National Lime & Stone Co.	Bluffton, Ohio
Belle Center Stone Co.	Belle Center, Ohio
Higgins Stone Company	Bellevue, Ohio
Lake Erie Limestone Company	Youngstown, Ohio
Lake Erie Limestone Company	Lowellville, Ohio
Lake Erie Limestone Company	Hillsville, Pa.
Lima Stone Company	Lima, Ohio
Spencer Stone Company	Spencerville, Ohio
Union Limestone Company	Youngstown, Ohio
Ohio Marble Company	Piqua, Ohio
C. C. Beam	Melvin, Ohio
Rock Products Company	Toledo, Ohio
France Stone Company	Holland, Ohio
France Stone Company	Monroe, Mich.
Swint Stone Company	Fremont, Ohio
J. E. Baker Company	Bainbridge, Lancaster Co., Pa.
J. E. Baker Company	White Hall, Baltimore, Md.
New Castle Lime & Stone Company	New Castle, Pa.
New Castle Lime & Stone Company	Dunbar, Pa.
Lehigh Stone Company	Ormrod, Pa.
Stowe Trap Rock Company	Pottstown, Pa.
Carbon Limestone Company	Hillsville, Pa.
Blue Stone Quarry Company	Gwynedd Valley, Pa.
Whiterock Quarries	Pleasant Gap, Pa.
Connecticut Quarries Company	Rocky Hill, Conn.
New Haven Trap Rock Company	New Haven, Conn.
Edward Balf Company	Hartford, Conn.
John S. Lane and Son	Westfield, Mass.
West Roxbury Trap Rock Company	West Roxbury, Mass.
Old Colony Crushed Stone Company	Quincy, Mass.
Rowe Contracting Company	Malden, Mass.
Simbrico Stone Company	West Roxbury, Mass.
Casper Stolle Quarry & Construction Co.	East St. Louis, Ill.
Consumers Company	Lemont, Ill.
Federal Stone Company	LaGrange, Ill.
Michigan Limestone & Chemical Company	Rogers City, Michigan
Blesanz Stone Company	Winona, Minn.
Meshberger Bros. Stone Company	Berne, Ind.
Hy-Rock Products Company	Marengo, Ind.
Fanwood Stone Crushing & Quarry Co.	Fanwood, N. J.
Samuel Braen	Paterson, N. J.
Orange Quarry Company	West Orange, N. J.
Granite Rock Company	Logan, Calif.
Daniel Contracting Company	San Francisco, Calif.
Deitz Hill Development Company	Kansas City, Mo.
Rock Hill Quarries Company	St. Louis, Mo.
Texas Trap Rock Company	San Antonio, Texas
Dittlinger Lime Company	New Braunfels, Texas
James Stone Company	Corsicana, Texas
Franklin Limestone Company	Nashville, Tenn.
Gager Lime Company	Sherwood, Tenn.
John H. Wilson	Honolulu, Hawaii

CANADA

J. A. Bourbonnais	Vaudreuil, Que.
Canada Crushed Stone Corp.	Puslinch, Ont.
Coast Quarries	Vancouver, B. C.
Dufferin Construction Company	Innerkip, Ont.
Gordon Crushed Stone Company	Hagersville, Ont.
Thomas Langton Crushed Stone	Coldwater, Ont.
LaCie A. Desrosiers, Ltd.	Montreal, Que.
Puslinch Quarries, Ltd.	Puslinch, Ont.
Quinn Stone and Ore Company	Ft. William, Ont.
Rigand Granite Products Company	Rigand, Que.
Stone and Son	Ingersoll, Ont.
Standard Lime Company, Ltd.	Joliette, Que.
Walker Bros.	Thorold, Ont.
Warden King Company, Ltd.	Montreal, Que.

LET US FIGURE YOUR PROBLEMS

NIAGARA CONCRETE MIXER CO.

40 PEARL STREET

BUFFALO, N. Y.

The CRUSHED STONE JOURNAL

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It Won't Be Long Now!

THE Holiday Season is at hand and even though our thoughts at this time of the year turn to matters of a less serious nature we should not be unmindful of the fact that the close of this year marks the last lap before the Thirteenth Annual Convention of the Association, which will be held at the Hotel Gibson, Cincinnati, Ohio, January 20, 21 and 22, 1930. It is also well to bear in mind that the annual foregathering of the industry this year has a double significance as in addition to the usual convention activities, there will be held on Thursday, January 23, the day immediately following the annual meeting, a trade practice conference called by the Federal Trade Commission and presided over by E. A. McCulloch, its Chairman.

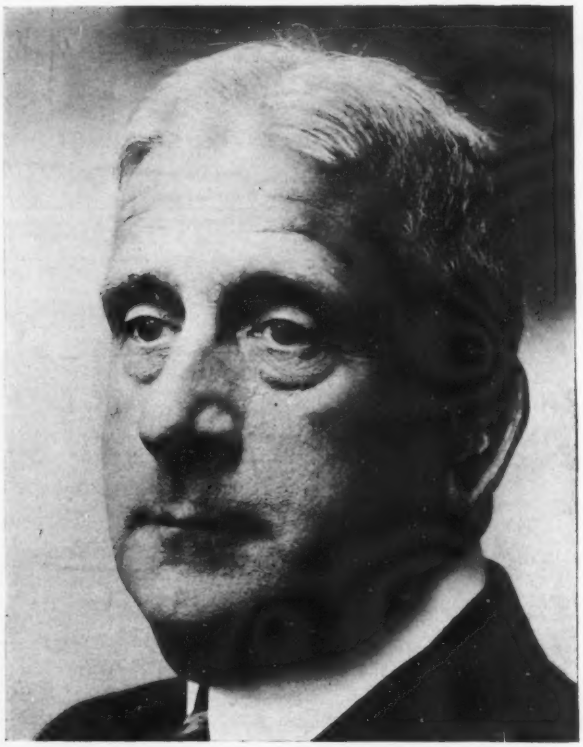
Too much emphasis cannot be placed upon the importance of these two events to the members of our industry. It would seem that little need be said as to the benefits producers derive from attending the annual meeting as in no other way can they keep in intimate touch with the vital affairs of their industry.

The annual meeting is a clearing house for information; a three-day institute dedicated to the progress of the industry; an opportunity for discussing with others engaged in the same activity problems of mutual interest; an opportunity to learn from highway officials, municipal engineers, railway executives, and business men of ways in which improvements in the industry should and can be made; and by no means least, to meet new friends and again clasp by the hand those whose friendship has become dear through years of association at the annual meetings. In short, a business meeting for business men; to be sure, relieved with fitting and appropriate social events, but primarily a *business* foregathering.

As a crushed stone producer you form an integral and inseparable part of the crushed stone industry. You cannot go it alone. Through cooperation with your fellow producers is the only way in which you can ultimately win success. That which you do, good or bad, is inevitably reflected in the general welfare of the industry. The National Crushed Stone Association represents the organized effort of the industry to govern its affairs for the common good which is largely accomplished through the annual meeting. You are privileged to participate in the administration of the Association's affairs and it is vitally necessary that every crushed stone producer assume the obligation which is thus placed upon him.

Attendance at the annual convention is your opportunity to give the industry the benefit of your counsel and advice which is so necessary to the proper conduct of its activities. Therefore, let nothing interfere with your being present and if you have not already done so, make your reservations immediately by writing direct to the Hotel Gibson, Cincinnati, Ohio.

Of equal importance with the annual convention is the Trade Practice Conference to be held on the day immediately following. The significance of this movement is seemingly so apparent that little amplification is necessary. Briefly, the purpose of the Conference is to remove from the industry those practices which are inimical to its best interests and at present constitute an unnecessary economic burden. A pamphlet dealing with this entire subject in detail has been prepared by the Association's committee on Trade Practice and is at present being distributed throughout the industry. You cannot dissociate yourself from whatever action this conference takes next January. You should therefore give the aforementioned pamphlet a careful study and come to the Conference prepared to act.



Upper Left—Hon. Myers Y. Cooper, Governor of Ohio. Upper Right—Hon. Russell Wilson, Mayor of Cincinnati. Lower Left—R. L. Lockwood, Division of Simplified Practice, U. S. Bureau of Standards. Lower Right—R. H. Simpson, Chief Engineer, City of Columbus, Ohio.

Largest Exposition Assured

The Manufacturers' Division Exposition which will be held in conjunction with the Thirteenth Annual Convention, gives positive assurance as this issue of the "Journal" goes to press, of being the largest and most interesting in the history of the Association. A larger number of exhibitors occupying a greater floor area than ever before have already contracted for exhibit space. In this connection we wish to urge all executives to send their entire staff of superintendents and operating men. The valuable information to be derived by them from an inspection of the Exposition will more than repay you for the time and expense involved. It is significant that to date one member company has made advance reservations for 30 men, another for 20 men, still another for 15 men, and many for from 5 to 10 men. What is still more significant is the fact that in many instances an analysis shows that these same companies have sent large numbers of their superintendents and operating men for the past few years. To give them a vacation? By no means, but because, it is realized that by so doing a sound investment is made which will be repaid many times.

Program Nears Completion

The program for the Thirteenth Annual Meeting has with few exceptions now been completed and though some last minute changes may be necessary, it is essentially in the form in which it will be presented to the Convention. The tenative program is given at the conclusion of this article and we believe measures up to the excellent standards set in past years.

The Association is particularly fortunate in having Russell Wilson, Mayor of Cincinnati, to give the address of welcome on Monday morning and the Honorable Myers Y. Cooper, Governor of Ohio, to address the get-together luncheon on the same day. It will be noted that among the speakers there are included prominent government officials, highway officials, municipal engineers, and railway executives, all of whom are admirably qualified to talk to us on the subjects as shown, and who undoubtedly will have much to tell us of real interest and value.

The various committee reports to be presented at the convention represent an unusual amount of work accomplished during the past year and should contribute much to the information and data being collected regarding the various phases of the crushed stone industry. We earnestly suggest that you study this tenative program carefully as we are sure you will then come to the conclusion that you cannot afford to miss our Thirteenth Annual Meeting.

Railroads Authorize Reduced Fare

We are glad to be able to announce that the railroads have authorized reduced fare to the convention on the basis of the Round-Trip Identification Certificate Plan, which it will be recalled is the same plan which was in effect last year. Upon presentation to the ticket agent of the Round-Trip Identification Certificate, delegates to the Convention are entitled to purchase a round-trip ticket on the basis of fare and one-half or fare and three-fifths if a thirty day extension is desired. Thus you are assured before starting to the Convention of obtaining reduced rates as under this plan no definite number of certificates need be validated. It should be remembered, however, that certificates are only available through the Secretary's office in Washington and cannot be obtained from ticket agents. These certificates have recently been mailed to all members of the Association. Should additional ones be desired, a request should immediately be sent to the Secretary's office.

In conclusion, the National Crushed Stone Association wishes to take this opportunity of wishing its members and friends a most happy and prosperous New Year. As New Year's resolutions are the order of the day be sure and resolve to attend our Thirteenth Annual Convention. A hearty welcome will await you.

Remember

A trade practice conference for the entire crushed stone industry will be held on January 23, 1930, at the Hotel Gibson, Cincinnati, immediately following the annual convention of the National Crushed Stone Association.

We presume it is your intention to attend this conference and wish to urge that you also arrange to participate in the annual convention.

Make your reservations immediately by writing direct to the Hotel Gibson.

Reduced fares to the convention and conference can be obtained through means of the Round Trip Identification Certificates. Such certificates will be forwarded from the Secretary's office in Washington upon request.

Tentative Program Cincinnati Convention

January 20, 21, 22 and 23, 1930

(This Program is Tentative only and Subject to Modification)

MONDAY, JANUARY 20

MORNING SESSION

W. F. Wise, President, Presiding

10:00—Address of Welcome—Hon. Russell Wilson, Mayor of Cincinnati, Ohio.

10:15—Response for the Association—E. E. Evans, Whitehouse Stone Co., Toledo, Ohio.

10:25—Report of the President—W. F. Wise.

10:40—Reports of Directors on Business Conditions in 1929 and Outlook for 1930.

12:00—Appointment of Convention Committees:
- Resolutions
- Nominating
- Finance
- Auditing
- Reception
- Publicity
- Constitution and By-Laws

12:30—Report on Incorporation of Association—Otho M. Graves.

12:45—Adjournment.

1:00 to 2:00 P. M.—Greeting Luncheon—Everyone, including active and associate members, as well as guests, is cordially invited to attend.

Luncheon Address—Hon. Myers Y. Cooper, Governor, State of Ohio.

MONDAY, JANUARY 20

AFTERNOON SESSION

A. L. Worthen, Member, Executive Committee, Presiding

2:30—Report of Membership Committee—J. R. Boyd, Chairman.

2:40—"To What Extent Does a Highway Bond Protect the Materials Producer?"—M. O. Garner, General Counsel, National Surety Co., New York City.

3:10—Discussion—Led by Harold Williams, Member of the Boston Bar, Boston, Mass.

3:20—"Cooperation Between Producers and Construction Engineers"—Paul M. Tebbs, Asst. Chief Engineer, Pennsylvania Dept. of Highways, Harrisburg, Pa.

3:40—Discussion.

3:50—"Simplification in Industry"—R. L. Lockwood, Division of Simplified Practice, U. S. Bureau of Standards, Washington, D. C.

4:10—Report of Committee on Standards—F. S. Jones, Chairman.

Sub-committee for the Standardization of Commercial Sizes of Crushed Stone—A. T. Goldbeck, Chairman.

Sub-committee for the Standardization of Drilling Equipment—A. L. Worthen, Chairman.

Sub-committee for the Standardization of Plant Equipment—F. W. Schmidt, Chairman.

Sub-committee for the Standardization of Specifications and the Marking of Supplies and Equipment—John Rice, Jr., Chairman.

Sub-committee for the Standardization of Quarry Equipment—A. G. Seitz, Chairman.

4:40—Discussion.

5:00—Adjournment.

MONDAY EVENING

7:30—Formal Opening of Manufacturers' Division Exposition of Quarry Equipment, Machinery and Supplies—Exposition Room.

9:30—Smoker and Entertainment.

TUESDAY, JANUARY 21

MORNING SESSION

H. E. Bair, Member, Executive Committee, Presiding

10:00—"Transportation—Past and Present"—M. J. Gormley, Exec. Vice-President and Chairman, Car Service Division, American Railway Association, Washington, D. C.

10:20—Report of Committee on Research—John W. Stull, Chairman.

10:30—"Some Researches and Their Practical Application"—A. T. Goldbeck, Director, Bureau of Engineering, National Crushed Stone Association.

10:50—Discussion.

11:00—"Pre-mixed Concrete"—Illustrated by motion pictures—Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio.

11:30—Report of Auditing Committee.

11:40—Report of Committee on Finance.

11:50—Discussion.
12:15—Further Report on Incorporation of Association—Otho M. Graves.
12:25—General Business.
12:30—Adjournment.

TUESDAY AFTERNOON

LUNCHEONS AND GROUP MEETINGS

Operating Men, Superintendents and Manufacturers

A. G. Seitz, General Crushed Stone Co., Presiding

1:15—Luncheon.
2:00—"In What Respects Should the Quality of Crushed Stone be Improved?"—A. S. Rea, Chief Engineer, Bureau of Tests, Ohio Dept. of Highways, Columbus, Ohio.
2:20—Discussion.
2:40—"Report of Committee on the Mechanical Elimination of Dust"—F. O. Earnshaw, Chairman.
2:50—Discussion.
3:00—Vibrating Screens—C. G. Adams, France Stone Co., Toledo, Ohio.
3:15—Revolving Screens—W. R. Sanborn, Lehigh Stone Co., Kankakee, Ill.
3:30—Discussion.
3:45—Question Box.
4:00—Adjournment.

Sales Problems

Wm. E. Hilliard, New Haven Trap Rock Co., New Haven, Conn., Presiding

1:15—Luncheon.
1:45—"Concrete Residence Floors"—R. E. Copeland, Portland Cement Association, Chicago, Ill.
2:15—Discussion.
2:30—"The Importance of Proper Specifications for Crushed Stone"—L. C. Bonnell, F. R. Upton, Inc., Newark, N. J.
2:45—Discussion—Led by A. B. Rodes, Franklin Limestone Co., Nashville, Tennessee.
3:00—"Stone Sand—Its Successful Use and Characteristics"—M. L. Jacobs, Bethlehem Mines Corp., Bethlehem, Pa.
3:15—Discussion—Led by Dr. H. F. Kriege, France Stone Company Laboratory, Toledo, Ohio.
3:30—Report of Committee on Ballast—E. J. Krause, Chairman.
3:45—"Group Advertising to Promote Sales"—Col. E. J. McMahon, Exec. Sec'y, St. Louis Quarrymen's Association.
4:00—"Individual Advertising"—D. W. Saffel, Sales Mgr., Greer Limestone Co., Morgantown, W. Va.
4:15—Discussion—Led by C. A. Munson, New Haven Trap Rock Co., New Haven, Conn.
4:30—Adjournment.

Annual Meeting of the National Agstone Association

N. G. Farber, President, Presiding

1:00—Luncheon.
2:00—Address by President N. G. Farber.
2:30—"Shakespeare—The Master Salesman"—W. B. Burruss, internationally known business counsellor.
3:00—Informal discussion.
3:15—Committee reports.
3:45—Report of Officers.
4:15—Election of Directors.
4:30—Election of Officers.
4:45—Address of President-elect.
5:00—Adjournment.

WEDNESDAY, JANUARY 22

MORNING SESSION

W. F. Wise, President, Presiding

10:00—"A Summary of the Various Types of Sewage Treatment Works with Overall Costs and Comments on Their Application"—Samuel A. Greeley, Pearse, Greeley and Hansen, Hydraulic and Sanitary Engineers, Chicago, Ill.
10:20—Discussion.
10:30—"Tests of Pavement Concrete being conducted by the Bureau of Public Roads"—F. H. Jackson, Senior Testing Engineer, U. S. Bureau of Public Roads, Washington, D. C.
10:50—Discussion.
11:00—"Airport Paving"—R. H. Simpson, Chief Engineer, Department of Public Service, Columbus, Ohio.
11:15—Discussion.
11:25—"The Development of County Roads"—Chas. M. Upham, Engineer-Director, American Road Builders' Association, Washington, D. C.
11:45—Report of Committee on Resolutions.
11:55—Report of Committee on Constitution and By-Laws.
12:10—Report of Nominating Committee and Election of Officers.
12:30—Greeting of President-elect.
12:45—Adjournment.

LUNCHEON

1:00 to 2:00 P. M.

Buffet luncheon will be served in the Exposition

Hall for those wishing to avail themselves of the opportunity for conference with manufacturers of machinery, equipment and supplies.

WEDNESDAY, JANUARY 22

AFTERNOON SESSION

C. M. Doolittle, Canadian Regional Vice-President, Presiding

2:00—Report of Committee on Trade Practice—Otho M. Graves, Chairman.
2:30—Discussion.
3:30—Report of Accident Prevention Committee—H. E. Rodes, Chairman.
3:40—Discussion.
4:00—Address—L. R. Cartwright, Vice-Pres., Mid-West Crushed Stone Co., Indianapolis, Ind.
4:20—"A Service for Employers in the Crushed Stone Industry"—J. V. Scott, National Safety Council, Chicago, Ill.
4:30—General Business.
4:45—Adjournment.

WEDNESDAY EVENING

ANNUAL BANQUET

Roof Garden, Hotel Gibson
7:30 P. M.

Toastmaster—Russell Rarey, The Marble Cliff Quarries Company, Columbus, Ohio.

Speakers—

Presentation of National Crushed Stone Association Safety Trophy—By a representative of the United States Bureau of Mines.

"The Futur of Business"—Hon. Geo. E. MacIlwain, Business Economist, Lecturer, Author and Analyst.

"Cooperation"—Captain Irving O'Hay, Philosopher and Humorist.

THURSDAY, JANUARY 23

10:00—Trade Practice Conference for the entire crushed stone industry, called by the Federal Trade Commission and presided over by its chairman, E. A. McCulloch.

8:00 P. M.—Meeting of the Board of Directors.

LADIES' ENTERTAINMENT PROGRAM

Mrs. A. Acton Hall, Ohio Marble Company, Piqua, Ohio, in charge of Arrangements

MONDAY, JANUARY 20

10:00—Registration.
3:30—Reception and Tea in ladies' headquarters.
8:15—Card Party at the Hotel Gibson.

TUESDAY, JANUARY 21

10:15—Ladies assemble at headquarters.
10:30—Sightseeing trip, including visit to famous Rookwood Pottery and many other interesting points, stopping at
12:30—Alms Hotel for lunch.
Following luncheon, continue on sightseeing trip.
4:00—Return to hotel.

WEDNESDAY, JANUARY 22

10:15—Tour of Cincinnati's exclusive shops, including Loring Andrews, Lawtons, Giddings.
12:00—Ladies assemble at headquarters.
12:15—Luncheon—Chatterbox, Hotel Sinton.
2:00—Visit Art Collection at the home of Mr. and Mrs. Chas. P. Taft, located three blocks from the hotel.
7:30—Annual Banquet.

THURSDAY, JANUARY 23

12:15—Ladies assemble at headquarters.
12:30—Luncheon—Florentine Dining Room, Hotel Gibson.

Highway Work Likely to Exceed 1929 Figure

THE estimated total expenditure for state road work in 1930, reported by 42 states, is $668,000,000, which is $76,000,000 more than the expenditure of the same states in 1929. Only three states anticipate a definitely smaller expenditure, and only thirteen states report that there will be no increase. One-half of the states report specifically that the condition of the bond market will not affect their highway financing; no state indicates that it will be a factor. This means that the approximate total of two billion dollars annual road and street construction by all public authorities will easily be maintained. The bond market will have no influence on state road funds.

These conclusions are based on personal interviews with leading highway officials of a score of states and on telegraphic statements from the highway departments of 42 states. There is no danger of sectional slump in highway activities. At most two or three individual states report a doubtful situation because of factional politics. In all these special cases the condition is an old one and of no special significance in the present juncture.—*Engineering News-Record*, November 28, 1929.

Bituminous Retread for Macadam Roads[1]

By B. C. TINEY, *Maintenance Engineer, State Highway Department, Michigan*

THE past few years have seen the extensive development in a number of States, of a form of bituminous surface known as retread. It is reported that this type of surface was first laid in Pennsylvania, where it was desired to salvage a considerable mileage of broken stone and shale roads and make them suitable for modern traffic.

Retread consists essentially of a course of stone mixed with bituminous material by blading on the road. Its purpose is to provide a cheap, dustless and smooth-riding top course for old macadam, gravel or broken-stone roads. It may be classified, in value, as being intermediate between bituminous surface treatment and penetration macadam. Old roads which are to be used as foundations for retread should have sufficient thickness of metal to sustain the weight of traffic and should have proper drainage. Preparation of these base courses involves the following operations:

1. Strengthening any weak places in the base by addition of new metal. This may require the digging out of soft subgrade and placing stone to considerable depth.

2. Placing stone drains or tile in the subgrade at points where the spring break-up has indicated that drainage is not adequate.

3. Bringing the surface to proper smoothness and cross-section by blading or by patching.

4. Surface treating the base with one-fourth gallon per square yard of cold application bituminous material, provided it has not been previously treated.

The aggregate for retread may be limestone, trap rock or any hard, durable stone which is clean and dustless. It should range in size from $\frac{5}{8}$ inch to $1\frac{1}{4}$ inches. Partially crushed gravel has been used for this work, but it is found that any rounded aggregate tends to ravel and that all crushed material gives the most stable mixture.

The stone is spread uniformly on the base, to a depth of about 2 inches, and bladed to a proper grade and cross-section with graders. It is then given an application of about $\frac{3}{4}$ gallon per square yard of a medium grade of bituminous material and is bladed immediately, to its entire depth, to effect a complete coating of the stone. Blading is continued until a satisfactory mixture is obtained or until the bituminous material begins to set, at which time the mixture is brought to proper grade and cross-section and rolled. After the first rolling, inequalities in the surface are corrected by further planing with a grader or drag. Following this, the surface is rolled until thoroughly compacted.

When the surface has setup, a seal coat of bituminous material shall be applied at the rate of $\frac{1}{4}$ gallon per square yard, followed by a covering of stone chips or pea gravel in the amount of about 20 pounds per square yard. Any small surface irregularities may then be removed by further dragging. The surface is then finally compacted by rolling. It should be kept in mind that one of the primary purposes of placing a retread top is to improve the riding qualities of the road, and that this is accomplished largely by very careful dragging and planing of the mixture. Good workmanship on this feature is very essential.

In blading the mixture, the base course should not be disturbed. The mixing operation should be confined to the width of the road surface to avoid incorporating earth or other foreign matter from the shoulders.

The bituminous material to be used should be such as to require heating for application. It should set within a few days time, but not too quickly to allow proper time for blading.

In future work it is believed advisable to separate this $\frac{3}{4}$ gallon into two approximately equal applications, the second to be applied when the mixing is partly completed and before the first application has begun to set. This will guard against loss of material by flowing to the sides of the road before it can be mixed.

About 30 miles of bituminous retread surface has been placed, to date, on the State trunk-line system in Michigan. Practically all of this work is in the Upper Peninsula and was laid in 1928. One short section in Delta County was laid in 1927. A few counties have placed a limited mileage of retread on their county road systems. In the work done by the State Highway Department, tar meeting our specification Mich. HTM has been used. A similar grade of tar and also cut-back asphalt has been used in other States.

[1]From October, 1929 issue of *American Highways*.

The work done in Michigan has cost approximately 50 cents per square yard, or $5,000 per mile, for a 2-inch course. This compares closely with costs which have been investigated in some other States. Subsequent maintenance consists of patrol patching and occasional surface treatments. Our experience with this type of surface has not extended over a sufficient period of time to furnish any data on the cost of subsequent maintenance. It would appear, however, that with a proper base such a surface would approximate that of a penetration macadam type in future maintenance costs.

The above methods, with some variations, have been followed in other States, with substantially the same results. The writer recently had opportunity to inspect an extensive mileage of bituminous retread surface in Kentucky and Tennessee. These States have a large mileage of gravel and traffic-bound macadam roads on which it is imperative that some inexpensive form of improvement be made until such time as their finances will permit the construction of pavement. State highway officials in both of these States express themselves as heartily approving of retread for this purpose. Their experience to date certainly warrants this attitude, as they have many miles of splendid riding retread surface, some of which is carrying heavy traffic successfully. Their surfaces are laid somewhat thinner than 2 inches, and in many cases are not immediately given a seal coat, thus leaving a rather open and very nonskid surface. In fact, one of the outstanding impressions left in the driver's mind on these roads is the feeling of safety in rounding curves. It is our thought that weather conditions in the Northern States would make it inadvisable to build a course thinner than 2 inches, or to have such an open surface as is possible in the South. Retread is somewhat similar to the so-called "turn-over" surface treatment as practiced in Wisconsin, except that the Wisconsin method utilizes the loose gravel which is on the road surface. The fact that this gravel aggregate is apt to consist of rounded pebbles, and to be nonuniform in grading, with an excess of fine material, tends to make a much less stable mixture than a retread mixture composed of well-graded angular stone.

The future development and use of retread in Michigan will depend largely on the service record of that which has been laid to date. We have not, at the present time, had sufficient experience with this type to pass intelligently on its merits. It has been laid almost entirely, in this State, on old, previously treated macadam which had become very rough and wavy after years of service. The fact that it has been successfully carried on gravel road bases in other States opens up possibilities for its extensive use in Michigan. It may become a rival of the hot-mixed asphaltic concrete top which has been laid on gravel road bases with the State-owned asphalt plant during the past few years. Retread cost per square yard is approximately one-half of the square-yard cost of asphaltic concrete, including black base. Subsequent maintenance cost of retread would, of course, be greater than that of asphaltic concrete. If we find that rough macadam, which has been smoothed up with retread, becomes rough again through frost heaving or other subgrade disturbance within two or three years, then the retread could not be considered as an economical improvement. Complete reconstruction would be preferable. But if retread will transform a rough-riding macadam road into a smooth one and will hold it as such with only nominal maintenance for a period of five years or more, then it could be considered a good value.

$175,000,000 in Gasoline Taxes Paid in 47 States in Six Months

NOT counting refunds made, the total amount of the gasoline tax collected by 47 of the States and the District of Columbia in the first six months of 1929 amounted to $175,140,140, says the Bureau of Public Roads, U. S. Department of Agriculture, on the basis of figures reported to the bureau. In New York the tax became effective May 1, and the Illinois law did not become effective until August 1. A total of 5,693,872,662 gallons was taxed in the 47 States and the District of Columbia. The average tax paid per gallon was 3.07 cents.

In 1928, gasoline tax paid in the first six months of the year in 45 States, the District of Columbia, and in Illinois for one month of the period, was $140,635,398. The tax in Illinois was collected for January and discontinued in February. Massachusetts and New York had no gasoline tax in 1928. The total number of gallons taxed in the first six months of 1928 was 4,652,393,536, and the average tax paid was 3.02 cents per gallon. All the States now collect a gasoline tax.

Highway Engineers Working Toward Development of Low-Cost Surfaces

TO determine how best to use light oil products in the construction of low-cost roads with smooth, dustless, year-round surfaces, a joint technical committee created in March and representing the asphalt industry and the Bureau of Public Roads of the U. S. Department of Agriculture, has outlined four principal lines of investigation, said H. S. Fairbank, highway engineer of the bureau and chairman of the bureau's research committee, at the Asphalt Paving Conference held recently at West Baden, Ind.

The committee proposes to make a detailed study of the results of the methods of bituminous treatment developed in many parts of the country, to study the efficacy of the methods of applying and mixing asphalt and aggregates, to analyze the asphaltic materials actually used in work done to date and all available materials which might be used, and to build and study experimental roads of various types. Some of this work has been under way for some time.

A detailed analysis of the methods, materials, cost, and service of the various types of low-cost surfaces thus far developed in various localities will be made, Mr. Fairbank stated. Among the types to be studied are the sand-clay and topsoil surface treatments in the Southeastern States; sand-asphalt surfaces in Massachusetts, North Carolina, and other States; bituminous treatments of clay roads in Illinois and elsewhere; the retread method of Indiana and somewhat similar treatment of stone roads in other States; the so-called blotter treatment of gravel roads in Minnesota and adjacent States; oiled sand roads in California, Nebraska, Nevada, and elsewhere; and the mixed-in-place treatment of fine-crushed rock and gravel surfaces, which has reached its highest development in the Western States.

Studies have already been made of surfacing treatments of sand-clay and topsoil in Florida and South Carolina, and also of oil treatments of clay roads in Illinois and of the retread method in Indiana, the Federal engineer reported. The data gathered by engineers of the bureau, the asphalt industry, and the respective States, are being analyzed and reports on the three types will be published shortly, he stated.

Studies of the efficiency of construction methods and equipment are being conducted by the bureau with the advice and assistance of the asphalt industry, Mr. Fairbank reported. These studies are similar to those previously made by the bureau in grading and concrete and bituminous pavement construction.

The study and analysis of the available bituminous materials is the particular responsibility of the industry, under the plan of cooperation that has been agreed upon.

The construction and study of experimental roads has been started and will be actively prosecuted, mainly by the Bureau of Public Roads, Mr. Fairbank stated, in cooperation with several of the State highway departments, but always with the active assistance and advice of representatives of the asphalt industry.

Three experiments are now in progress, he said. One is the continuation of surface treatments of topsoil in South Carolina; another is a series of experiments in California involving the treatment of fine-crushed rock and gravel surfaces with several types of bituminous materials by surface treatment and mixing-in-place; the third is a series of experiments in the treatment of sandy soil in the sand-hill section of Nebraska with various asphaltic materials.

There is today a need for low-cost methods of improving hundreds of thousands of miles of highways in the country, consisting of gravel, sand-clay, and topsoil and graded and drained earth roads, Mr. Fairbank said. The traffic on these roads is such as to require a smooth, dustless year-round surface, but not great enough to justify the costlier high-type surfaces, he stated.

About six years ago the bureau first became interested in the development of low-cost surfacings, using bituminous materials to lay the dust and reduce the loss of surfacing material. At that time, increase in traffic on the forest roads, which had been constructed under supervision of the bureau, gave rise to a dust nuisance and loss of surfacing material. The forest roads had a surfacing of finely crushed rock or gravel, which had been adequate for traffic up to that time. A similar type of surface had been adopted by a number of the Western States and a rather considerable mileage had been built.

Highway Building Recommended to Aid Prosperity

PRESIDENT Hoover's support for proposed legislation for the creation of a commission to study proposals for a national system of express motor highways as a means of promoting continued prosperity and aiding in the solution of the unemployment problem was requested by a congressional delegation who called at the White House recently.

The delegation consisted of Senator Phipps (Rep.), of Colorado, chairman of the Senate Committee on Postoffices and Post Roads; Representative Tilson (Rep.), of New Haven, Conn., House majority leader; Representative Robsion (Rep.), of Barbourville, Ky., ranking majority member of the House Committee on Roads, and Lester P. Barlow, of Detroit, Mich., an engineer and president of the Union Highway Association.

Resolution is Pending

President Hoover's attention was called by the delegation to the Phipps-Robsion joint resolution introduced in Congress on June 4, 1929, which provides for a commission to study the advisability of the Federal Government's aiding in the construction of express motor highways. Copies of the resolution were laid before the President together with suggestions regarding the proposal and a memorandum of the plan for an express highway system, as worked out by Mr. Barlow.

The members of the delegation united in statements urging the necessity for the creation of a commission to study the proposal as a means to relieve traffic congestion.

Economies are Predicted

"There is urgent need," said Senator Phipps after the conference, "for Federal action to straighten out the national traffic tangle. The proposed commission would make a thorough and impartial inquiry, as its members would consist of representatives of the public and of all interested Government departments, including the House and Senate. Such research work might save years of haphazard investigation, as well as hundreds of millions of dollars to the taxpayers of the Nation.

"It is time to consider the feasibility of public-owned express highways, especially in view of recent efforts to obtain private concessions of this nature. Roadways on which faster and more direct traffic will be permitted are becoming a national necessity, and I believe that the Federal Government should take the lead in this important work."

Representative Tilson stated orally that numerous suggestions have been made lately looking to the establishment of a national system of express motor highways connecting large centers of population throughout the country.

"Experts on highway problems agree," he said, "that many links in a system of this character could now be built and the cost of them amortized over a period of years out of tolls. The large income derived from toll bridges, of which there are now hundreds throughout the country, and of small stretches of road at various places, offers proof that the opinion of experts on this question is sound.

"A program of this character could be carried out, it would seem, in such a manner as to stabilize employment conditions, work being reduced to a minimum when the labor demands of private industry are large, and expanded when private industry is depressed. Mr. Barlow, of Detroit, who called on the President with us, has suggested one plan which seems to have merit.

"The problem is too vast to be hastily considered. All we are suggesting at this time is the creation of a commission to study the proposal of Mr. Barlow and others.

"No one wishes toll roads or toll bridges, if they can be avoided, but it is better to have a system of publicly owned national express motorways which shall be toll roads for a time and then become free than to have our arteries of transportation blocked by numerous toll bridges and perhaps later by stretches of toll roads which are privately owned and operated."

"Those who have made a careful study of the subject," said Representative Robsion, "assert that our motor transportation is less than 25 per cent efficient, due to congestion and the lack of improved highways. The great congested districts of the country extend from New York to Boston, and from New York to

Philadelphia; also in and about Chicago, Detroit, and other points. Ordinary highways cannot carry the traffic. Transportation is held up and tens of millions of dollars are lost every year because of these congested conditions. Already private individuals have sought and will continue to press claims before State legislatures to give them the right to construct express motorways with toll-charge privileges.

"Our 25,000,000 motor vehicles have created a great need for bridges across our rivers and streams, and private toll bridge interests have been very busy to secure rights to construct, own, and control these bridges. The people of the Nation have become alive to the situation and are urging that they be constructed, owned, and controlled by the public, even though it may be necessary to issue bonds against the revenues of the bridges to secure funds to construct them.

"Many of us insist that if express motorways are to be built they should be laid out, constructed, owned and controlled by the States with the cooperation of the Federal Government, thereby limiting these motorways to the places where needed and looking to a coordinated and a unified system, forming a part of our present Federal and State highway systems, likewise in aid of our program of national defense and, furthermore, to keep the public from being exploited by private interests.

"We consider this one of the great pressing problems of the Nation, and it is proposed to create a commission of 11 members—composed of two Members of the Senate, two Members of the House, and made up of both of the major parties and appointed, respectively, by the President of the Senate and the Speaker of the House, and one each from the Departments of Agriculture, Post Office, Commerce, Treasury, War, and Labor, and one person not connected with the Government thoroughly familiar with traffic problems, these seven members to be appointed by the President with the advice and consent of the Senate. No member of this commission will receive any compensation for his services as such member.

Methods of Financing Work Would Be Studied

"Among other things this commission will make a careful survey as to the necessity of these highways; and second, whether they should be constructed, controlled and operated by private interests or the public; third, if constructed, controlled and operated by the public, should the funds be secured from public revenues or bonds issued, tolls charged and collected until the cost of the highway is met, and if this plan is adopted should the Federal Government loan to the States sufficient money at a low rate of interest to construct the highways; fourth, make a study of a coordinated, unified system, each section to be built as the traffic demands may require; fifth, also to make a study of how these highways may be constructed to furnish employment during unemployment periods of the Nation.

"We feel that there should be a careful study made of these questions so that the Congress and the country may have proper information on which to base sane legislation, if it should be determined that Congress should legislate on this question. We are hopeful that the building of these express motorways may help in President Hoover's program to promote continued prosperity and afford employment for the unemployed.

"The Congress and the country need this information, and we feel that this commission will be able to secure it."

Mr. Barlow's Plan is Summarized

The plan proposed by Mr. Barlow which, it was said, will be one of those considered by the motorways commission if created, is substantially as follows:

"The laying out of a system of express motorways throughout the country, designed to take and expedite motor travel and transportation between large centers of population.

"The building of links in this network by cooperation between the Federal, State, and municipal governments as soon as such links can be operated on a toll basis at a profit.

"Amortization of the cost of such links by tolls, the roads ultimately to become free, but not to become free until they have paid their own cost and aided in the financing of adjoining links.

"Each link to be financed on the basis of State and/or municipal bonds at a low rate of interest (perhaps as low as 1 or 1½ per cent) deposited with the Federal reserve system and against which Federal reserve notes should be issued, the tolls to be used to pay off both interest and principal, so that each link which is built at a point where the travel warrants it will in the end cost neither the Federal Government, the States, nor the municipalities anything."

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J. R. BOYD, Editor

7,800 Miles of Federal-Aid Road Built in United States in 1928

COMPLETE statistics for the United States for the calendar year 1928 covering all roads constructed by Federal, State, and local agencies, compiled by the Bureau of Public Roads of the U. S. Department of Agriculture, indicate that Federal aid has helped materially in the construction of the higher types of surfacings.

During the year a total of 74,783 miles of highways were improved, says the bureau. With State and Federal funds and the cooperation of the U. S. Bureau of Public Roads, the States constructed 7,814 miles of roads and 47 miles of bridges in the Federal-aid system. With State funds alone the States improved 21,391 miles of State roads, and the counties and other local units constructed 45,531 miles of county and local roads.

Consistent with their superior importance, as shown by traffic surveys, the Federal-aid road improvements were generally of higher type than improvements made on other State roads and on the local roads. As fast as funds become available, high-type surfaces are being constructed by States and counties where traffic requires them. Medium-type pavements, which cost less to construct than the high-type, are built where traffic is not so great, and the greater proportion of unsurfaced roads constructed are of local importance.

For purposes of comparison, the year's total mileage is divided into three general types—high-type surfacing, of which 8,286 miles were constructed in 1928, consisting of bituminous concrete, Portland-cement concrete, sheet asphalt, and brick; medium-type, of which 7,617 miles were constructed, these being surfaced with water-bound and bituminous macadam; and low-type, of which 58,880 miles were improved, these being graded and drained earth roads, sand-clay and top-soil and gravel.

In the year, the States, with Federal aid, improved 3,308 miles of Federal-aid roads with high-type pavements and bridges, or 39 per cent of the total; with State funds alone they constructed 3,461 miles, which was nearly 42 per cent of the total of that type built. The counties constructed 1,517 miles of high-type highways, a mileage which was 18 per cent of the total.

Of the medium-type construction, the States, with Federal aid, improved 602 miles of Federal-aid roads, which was almost 7 per cent of the total. With State funds alone they constructed 2,383 miles, or 31 per cent of the total of that type built. The counties improved 4,632 miles of road of this type, which was about 61 per cent of the total mileage of the type built in the year.

The largest mileage of low-type roads was constructed by the counties, 39,382 miles, almost 67 per cent of the total built in the year. The States, with Federal aid, improved 3,951 miles, or more than 6 per cent of the total, and with State funds alone they improved 15,547 miles, or 26 per cent of the total of these types built in the year.

Symposium on Mineral Aggregates

WE have just been advised that the American Society for Testing Materials has ready for distribution a "Symposium on Mineral Aggregates." This publication should be of distinct interest and value to all crushed stone producers. It can be obtained by writing direct to the A. S. T. M., 1315 Spruce St., Philadelphia, Pa. The prices per copy are as follows: 1 to 9 copies, $1.00; 10 to 49 copies, $.75 over 50, $.60.

Increased Funds Asked For Federal Aid Highways

THERE are two schools of thought in Congress regarding increased appropriations for Federal aid to the States for the Federal aid highway system throughout the country, Representative Kelly (Rep.), of Pittsburgh, Pa., stated orally recently. The major element in Congress in all probability, he said favor augmented highway facilities. The opposition is on the ground that the more prosperous States are carrying on the burden of the less prosperous. Mr. Kelly is a majority member of the House Committee on Post Offices and Post Roads.

"I believe the sentiment of the country and of Congress favors expansion of highway facilities," Mr. Kelly said. "I am in favor of the announced program of the Chairman of the House Committee on Roads, Representative Dowell, of Iowa, for $145,000,000 instead of $75,000,000 annually for Federal aid for highways and for $10,000,000 instead of $7,500,000 annually for roads and trails in the forest reserves of the United States. I would favor going even further than that increase, if it should be felt to be necessary and the Federal Government and the States could properly and economically make use of such augmented funds each year.

Opposition Noted

"I realize that there is opposition from some in the East. They take the position that we are taking out of the income-tax revenues of the East to help carry the road burdens of States that do not contribute to any great degree to the income-tax revenues of the Federal Treasury.

"But I do not agree to any such contentions with respect to the Federal aid highway system that is now a part of the great system of communication between the whole country. The United States today is a Nation—not just a community of States.

"American citizens in all sections are entitled to the benefits of good roads. On a recent trip through Yellowstone National Park I saw hundreds of Pennsylvania and New York cars on the roads and they were all through that part of the country. The same is true in other sections. We are envisaging the Federal aid system as a national program of import to the country as a whole.

"Good roads mean advantages to American citizens and to American business— no matter what their particular State may be. We should continue along the lines already established by increasing our national expenditures, along with the State expenditures, in order to keep pace with the steadily advancing tides of business.

Roads in Forests

"As a broad-visioned permanent national policy of gauging national expenditures according to the growing needs of the country as a whole I hope and believe that Congress will carry out the roads committee program of $145,000,000 for Federal aid roads and $10,000,000 for forest roads and trails annually hereafter. The former is a proposed increase of $70,000,000 over the present regular annual Federal aid funds. The latter is an increase of $2,500,000.

"And the increase of the forest road construction program is also important to the Nation's economic welfare. Both funds are to meet national needs.

"Road construction is an important part of the country's activities everywhere. I recall that the head of the Federal Bureau of Roads, Thomas H. MacDonald, just back from an important international road meeting in South America, told our House Committee on Appropriations within the past year that the Federal aid highway system then approximated 188,000 miles, that there was a total of upwards of 85,000 or 86,000 miles approved for Federal aid. Then he estimated that, as of the same date, the States had improved about 70,000 miles without the aid of the Federal cooperative funds.

"There are innumerable ways in which the facilitation of highway traffic wherever it may be is just as important to the great stream of interstate travel as to the immediate residents of a given city or commonwealth."

Cooperation Sought

The Chief of the Bureau of Public Roads, Thomas H. MacDonald, in his last statement of views before a congressional committee, told of the demand for cooperation in road building reaching this Bureau. "There is an insistent and growing demand for an increase in the Federal support of the annual road building program" he told the House Committee on Appropriations in urging the appropriation for the current fiscal year 1930. "For about eight years the

country as a whole has been spending from $1,000,000,000 to $1,500,000,000 annually for highway purposes. This has been roughly equally divided between work done under State supervision and that done under local supervision. The Federal-aid road system coincides with the State roads to the extent of about two-thirds of the total mileage of the latter system. The Federal-aid projects have constituted about one-half of the States' annual program, and the Federal contribution has been about 17 per cent of the total expenditures supervised by the States, or only about 8 per cent of the whole of the annual highway expenditures.

"The most generous contributors to the highway program by far have been the local units, particularly the counties. So we find now that in many States the counties have about exhausted their credit for aiding the building of the roads which legally are State, or State and national responsibilities, and there are no funds left to build the feeder roads."

Highways

THERE are over 3,000,000 miles of legally established highways in the United States, of which about 10 per cent are included in the State highway systems, the remainder being county and other local roads. About 626,000 miles have been improved with some type of surfacing, comprising some 63 per cent of the State highway systems and 16 per cent of the local roads. Of the improved roads about 102,000 miles are hard surfaced, comprising about 22 per cent of the State highway systems and about 8 per cent of the local roads.

While proper planning should materially reduce the listed mileage of public roads, particularly in the agricultural districts, and turn these roads back to useful purposes, it is evident that road construction must be a long-continued program. Progress in improvement is about 50,000 miles of all types per annum, of which some 12,000 miles are of the more durable types. The total expenditures of Federal, State, and local governments last year for construction and maintenance assumed the huge total of $1,660,000,000.

Federal aid in the construction of highway systems in conjuncton with the States has proved to be beneficial and stimulating. We must ultimately give consideration to the increase of our contribution to these systems, particularly with a view to stimulating the improvement of farm-to-market roads.

State Highway Bonds Will Pay States, Says U. S. Roads Chief

TODAY every State could issue bonds profitably, either for primary road building or some of the integral or auxiliary construction needed, such as grade-crossing elimination, bridges, by-passes around traffic congestion, and continuous-flow routes without cross-traffic hazards and interruptions, says Thomas H. MacDonald, chief of the Bureau of Public Roads, U. S. Department of Agriculture.

"There is not a single valid argument against the issuance of bonds for road improvement as a fiscal matter," he says. "The issuance of road bonds, intelligently and scientifically adjusted to the needs of the State, is the only way public credit can be exchanged for physical properties, better roads, among them, which are income producing and which do have the ability to pay for themselves."

In the States which have made the most rapid progress in road improvement, and which have advanced a part to the costs from bonds, there is not a single unfavorable situation or circumstance to support anti-bond arguments, he says.

By statistics he shows that in the 17 States that have issued no bonds for State highway purposes, the electorates of which are supposed to frown upon bond issues on general principles, high-interest local bonds have actually been issued in considerably greater proportion to local highway income than in States which presumably favor the issuance of bonds.

He proposes that there be more scientific and business-like financing and administration in highway improvement, which, he says, should start with a selection of roads to be improved according to their relative traffic importance and an allocation of authority to State and county authorities on the same basis.

"The differences in the percentages of total mileage included in the State systems of neighboring States of approximately the same general culture and development are too great to be accounted for upon any reasonable basis," he says. "Also, the differences are too great between the annual expenditures per mile of State system in States that have systems of approximately the same extent and average traffic density approximately equal. The traffic survey is a reliable means of determining how large the State system should be and how much money should be spent on the several parts of the system. It should be more generally employed in planning and budgeting. There is no

excuse for inequitable allocation of funds or wasteful expenditure," he says.

"The merry-go-round of income transfer now existent between the States and the counties should be abolished; the counties are rather generally the losers and they can ill afford the loss," he says. "The question of indebtedness for highway purposes should be more frankly faced. The public loses and loses heavily when, to avoid a State debt, the counties are thrust into debts on which they must necessarily pay a high rate of interest."

Mr. MacDonald says honest and competent highway officials should have reasonable security in their tenure of office, that highway administration should be business-like, that there should be complete and correct accounting of highway expenditures, and that roads in which the public capital is invested should be adequately maintained.

Federal-Aid Road Money Apportioned for Next Fiscal Year

RESPONDING to President Hoover's suggestion that public building programs be speeded up and prudently expanded to promote business and prevent unemployment, Secretary of Agriculture Arthur M. Hyde today apportioned among the 48 States and Hawaii $73,125,000 authorized by Congress as Federal aid for road construction in the fiscal year 1931.

The Secretary announced that the State highway departments will be authorized to proceed immediately with preparations for the expenditure of the newly apportioned funds during the next construction season.

For work during the winter, where weather conditions will permit, and in the spring and early summer throughout the country, Secretary Hyde stated there is available a balance of $28,000,000 of the Federal-aid funds previously apportioned, making a total of $101,125,000 with which the Federal Government is prepared to match at least an equal amount of State money for expenditure on Federal-aid roads during the calendar year 1930.

The Federal fund is apportioned among all States and Hawaii in proportion to their respective areas, populations, and mileages of post roads, and the share of each State is available for expenditure on roads included in the Federal-aid system under the joint supervision of the State highway department and the U. S. Bureau of Public Roads.

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Thirteenth Annual Convention

January 20, 21 and 22, 1930

Trade Practice Conference for the entire Crushed Stone Industry

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What Practical Quarry Men Think of Cordeau-Bickford

From time to time expressions of opinion regarding CORDEAU-BICKFORD come in from the trade and comments are made in articles. Some quotations from such sources are as follows:

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